N00173-14-Q-0332
Attachment 1

DESIGN AND CONSTRUCTION OF A CUSTOM INTEGRATED PRESSURE BASED FLOW MEASUREMENT, CONTROL AND SORTING UNIT FOR EXISTING FLOW-THROUGH OPTICAL CHROMATOGRAPHY INSTRUMENT

Detailed Specifications

The custom product needs to provide the design, construction and integration of a custom piece of pressure based flow control and sorting hardware to support our existing portable Flow-Through Optical Chromatography analysis instrument. To achieve this, a custom hardware and software solution is needed. The custom hardware will integrate pneumatic pulseless liquid flow control, nanoliter per minute flow measurement and necessary programing with existing hardware and software. The flow control unit will need to be capable of managing 6 simultaneous flow measurement and control connections that mix on our existing microfluidic device. The end product will be controlled from the existing instrument software via a single USB or other interface, be able to control and measure flow within our microfluidic platform and integrate completely with the existing instrument. The custom solution will need to incorporate NRL provided flow sensors and electronic pressure controllers.

- Design of a custom flow measurement and control hardware unit
    - Pulseless pressure based liquid flow control for 6 simultaneous microfluidic connections
    - Combine flow sensor and pressure control hardware connections on a custom PCB
    - PCB will need an integrated controller for flow control and an interface to the existing instrument software
- Construction of flow measurement and control unit
- Development of custom software to integrate the unit with the existing instrument
    - Custom PCB controller software will need to be written to achieve several flow control modes, including flow control for each fluidic connection, and several user specified flow programs such as but not limited to flush, clean, inject and sort.
- Installation and testing of unit in existing instrument
- Documentation and user manual